

REMARKS/ARGUMENTS

Favorable reconsideration of the above-identified patent application, in light of the above amendments and the following remarks is respectfully requested. The presently pending claims are claims 1-4 and 6-20. Claims 1, 2, 4, 8, 13, 15, 16, 17, 18, and 20 have been amended. Claim 5 has been canceled.

In paragraph 1 of the Office Action, the Examiner objected to the specification because of an informality. In response, the Applicant has amended the specification to correct the informality.

In paragraph 2, the Examiner stated that the informal drawings were acceptable for examination purposes only. Upon allowance of the applications, formalized drawings will be submitted.

In paragraphs 3 and 4, the Examiner rejected claim 5 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner stated that the specification does not enable the control unit capable of controlling a plurality of control parameters through the internal control system associated with the HVAC system. The Examiner also stated that the specification only enables a monitoring of the performance characteristics of the HVAC system. In response, claim 5 has been canceled.

In paragraphs 5 and 6, the Examiner rejected claim 16 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner stated that in claim 16, it is not clear what is meant by “Y and G threshold voltage.” In response has amended claim 16 to particularly

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point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Applicant has amended claim 16 to more fully explain Y and G threshold voltages. The Examiner should note the explanation in the specification on Y and G threshold voltages starting on page 20, line 14.

In paragraphs 7 and 8 of the Office Action, the Examiner rejected claims 1-4, 6, 7, 10-12, 18, and 20 under 35 U.S.C. 102 (b) as being anticipated by U.S. Patent No. 6,179,214 to Key et al. (Key). The Examiner stated that Key discloses a diagnostic apparatus for examining an HVAC system.

In response, the Applicant has amended independent claims 1, 18 and 20 to better differentiate Applicant's invention from the cited reference. In addition, dependent claims 2-4 have been amended. Key discloses a portable control module for use upon an HVAC system. The portable control module of Key is a stand-alone control module which enables the control module to control the *service module* of the HVAC system. The control module is only connected to the service module associated with the HVAC. On the other hand, the Applicant's claimed invention performs two important functions. First, the Applicant's invention may control, as well as monitor, the HVAC system separately from the internal control system of the HVAC. Second, the Applicant's invention may *monitor the control signals* sent from the internal control system of the HVAC to the components of the HVAC system. Key does not disclose performing both these functions. Rather, Key merely discloses a control module which controls the service module of the HVAC system. Key does not monitor the control signals associated with the internal controller of the HVAC. Key cannot perform the powerful diagnostic functions claimed in the Applicant's

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invention. In addition, Key only applies to a system which contains a service module. Key requires connection of the control module directly to the service module. Key suffers from the disadvantage of having to operate directly with the service module. If the HVAC system does not have a service module, Key cannot be used. Further, if a system does not contain a service module that is not specifically designed to interface with KEY's apparatus, KEY cannot be used. KEY cannot be used to diagnose systems with an electronically driven motor.

In regards to claim 4, the Applicant further claims utilizing a single switch, rather than multiple switches to isolate the internal control system of the HVAC from the control unit. The Applicant's claimed invention, as recited in claim 4 simultaneously isolates the system from the control parameters by a single switch. The servicing of an HVAC is much easier through the implementation of the isolation by one switch. Key does not teach or suggest utilizing one switch to isolate the control system from the control unit.

Claims 2-4, 6, 7, 10-12 depend from amended independent claim 1 and recite additional limitations in combination with the novel elements of claim 1. Therefore, the withdrawal of the rejection and the allowance of claims 1-4, 6, 7, 10-12, 18, and 20 is respectfully requested.

In paragraph 9 of the Office Action, the Examiner rejected claims 1-4, 6, 7, 10, 12, 13, 18, 19 and 20 under 35 U.S.C. 102 (b) as being anticipated by U.S. Patent No. 4,146,085 to Wills (Wills).

In response, the Applicant has amended independent claims 1, 18 and 20 to better differentiate Applicant's invention from the cited reference. Additionally, dependent claims 2, 4, and 13 have been amended. Wills discloses an apparatus providing a monitoring of electrical

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connections between a logic module and the components of a heat pump. Wills provides a simplistic display showing only the electrical connections through the use of an ohmmeter. Applicant's invention provides two important functions. The Applicant's invention may control an electronically-driven motor of the HVAC system separately from the internal controller as well as monitor the control signals and parameters associated with the internal controller of the HVAC system. The Applicant's invention provides a far more robust monitoring capability than merely determining if there is an electrical short in a connection (Col. 7, lines 61-64). Unlike Wills, the Applicant's invention monitors control signals associated with the internal controller of the HVAC system, not merely voltage output from the controller to the outlying components of the HVAC. Additionally, the Applicant's invention controls an *electronically-driven motor* which requires specialized control signals. The Applicant's invention enables control of operating parameters such as the selection of the system capacity in the heating and cooling mode, motor start-stop delays, motor speed ramp rates and motor speed. Furthermore those parameters can be set to be identical to the way they are set in the system's internal controls thus permitting diagnosis of system faults while the system is operating identical in manner to the settings of the internal controls. Wills does not disclose such a device enabling control of these operating parameters. Wills not disclose and is unable to perform any control functions or diagnostics of an electronically-driven motor.

In regards to claim 4, the Applicant further claims utilizing a single switch, rather than multiple switches to isolate the internal control system of the HVAC from the control unit. The Applicant's claimed invention, as recited in claim 4 simultaneously isolates the system from the control parameters by a single switch. The servicing of an HVAC is much easier through the

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implementation of the isolation by one switch. Wills does not teach or suggest utilizing one switch to isolate the control system from the control unit.

Claims 2-4, 6, 7, 10, 12 and 13 depend from amended independent claim 1 and recite additional limitations in combination with the novel elements of claim 1. Additionally, claim 19 depends from claim 18 and recites additional limitations in combination with the novel elements of claim 18. Therefore, the withdrawal of the rejection and the allowance of claims 1-4, 6, 7, 10, 12, 13, 18, 19, and 20 is respectfully requested.

In paragraphs 10 and 11, the Examiner rejected claims 14 and 15 under 35 U.S.C. 103(a) as being unpatentable over Key (or Wills) and further in view of U.S. Patent No. 6,324,854 to Jayanth (Jayanth). In response, the Applicant has amended independent claim 1 to better differentiate Applicant's invention from the cited reference. Claims 14 and 15 depend from amended independent claim 1 and recite additional limitations in combination with the novel elements of claim 1. In addition, claim 15 has been amended. As discussed above, Key merely discloses a device which allows external and separate control of the HVAC system apart from the internal controller of the HVAC. The Applicant's invention enables a technician to analyze control signals associated with the internal controller sent to the components of the HVAC. Additionally, Key merely discloses providing a diagnostic apparatus for the service module (Col. 2, lines 10-15), not the control system of the HVAC system. Key does not have any stated purpose for evaluating the performance of the internal control system of the HVAC. The combination of Key and Jayanth does not teach or suggest the independent control of the HVAC system as well as the separate ability to monitor the HVAC internal control system.

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In regards to the combination of Wills and Jayanth, Wills discloses a simple monitor of electrical connections between a logic module and the components of a heat pump. Wills does not teach or suggest controlling an electronically-driven motor of an HVAC system. The combination of Wills and Jayanth does not teach or suggest an apparatus which monitors the control signals (not merely electrical connections) of the internal controller of the HVAC while providing a stand-alone capability of running separate components of the HVAC system. Wills merely provides very simple indications of the HVAC system, namely if there is a short present in the system. Neither Wills nor Jayanth teaches or suggest an apparatus which enables a thorough diagnostic capability of the electronically-driven motor or control of the HVAC system as is present in the claimed invention of the Applicant.

In regards to claim 15, neither Wills, Key, nor Jayanth disclose monitoring the speed of an electronically-driven motor. The Applicant's invention enables a serviceman to assess the performance of the HVAC system as installed in the application. Although Wills discloses reading temperatures and pressures, Wills doses not assess the installation effects on the HVAC system's operation. In addition, the cited references can only determine if the system is operating at its design levels, not at degraded levels caused by installation problems, such as duct work restrictions, airflow degradation, etc. Therefore, the withdrawal of the rejection and the allowance of claims 14 and 15 is respectfully requested.

In paragraph 12, the Examiner rejected claims 8 and 17 as being unpatentable over Key (or Wills) and further in view of U.S. 2001/00495097 to Pham et al. (Pham). In response, the Applicant has amended independent claim 1 to better differentiate Applicant's invention from the cited

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references. In addition, claims 8 and 17 have been amended to better differentiate Applicant's invention from the cited references. Claims 8 and 17 depend from amended independent claim 1 and recite additional limitations in combination with the novel elements of claim 1. Key has the stated purpose of providing diagnostics of the HVAC service module, not the internal controller of the HVAC. The Applicant's invention monitors and provides a powerful diagnostic apparatus for the internal controller of the HVAC system. As previously stated, Key's apparatus depends on the presence in the system of a service module placed in the system at added cost and for the sole purpose of interfacing with Key's service apparatus. The applicant's invention does not depend on the presence of a service module. The combination of Key and Pham does not teach or suggest performing the claimed diagnostic functions of the Applicant's invention.

In regards to the combination of Wills and Pham, Wills discloses a simple monitor of electrical connections between a logic module and the components of a heat pump. Wills does not teach or suggest controlling or analyzing an electronically-driven motor. The combination of Wills and Pham does not teach or suggest an apparatus which monitors the control signals (not merely electrical connections) of the internal controller of the HVAC, while providing a stand-alone capability of running the electronically-driven motor of the HVAC system.

In addition, Pham merely uses a duty-cycle signal to control the capacity of a specific type of compressor. Pham is not a diagnostic device. The purpose of the PWM output in the Applicant's invention is to exercise those control parameters that function on the basis of duty-cycle. Therefore, the withdrawal of the rejection and the allowance of claims 8 and 17 is respectfully requested.

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In paragraph 13, the Examiner rejected claims 9 as being unpatentable over Key (or Wills) and further in view of U.S. Patent No. 5,493,868 to Kikuiri et al. (Kikuiri). In response, the Applicant has amended independent claim 9 to better differentiate Applicant's invention from the cited reference. Claim 9 depends from amended independent claim 1 and recites additional limitations in combination with the novel elements of claim 1. As discussed above, Key merely discloses a diagnostic device for use on the service module. Key does not teach or suggest a device which monitors the control parameters associated with the internal controller of the HVAC system. The stated object of Key is to monitor and control the service module. However, the Applicant's invention provides an apparatus which provides diagnostics upon the internal controller of the HVAC system. The combination of Key and Kikuiri does not teach or suggest performing the claimed diagnostic functions of the Applicant's invention.

Wills discloses a simple monitor of electrical connections between a logic module and the components of a heat pump. Wills does not teach or suggest controlling or analyzing an electronically-driven motor. The combination of Wills and Kikuiri does not teach or suggest an apparatus which monitors the control signals (not merely electrical connections) of the internal controller of the HVAC while providing a stand-alone capability of running the electronically-driven motor of the HVAC system. Therefore, the withdrawal of the rejection and the allowance of claim 9 is respectfully requested.

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CONCLUSION

For all the above reasons, the Applicant respectfully requests the reconsideration and withdrawal of the rejection and the allowance of claims 1-4 and 6-20.

Respectfully submitted,


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